

In the Claims:

Please cancel claim 1 without prejudice or disclaimer.

Please amend claims 2-4, 7, 9 and 13 to read as follows:

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2. (Amended) The method according to claim 1 in which said core shaft and the cores thereon are brought substantially to web line speed by the driven nip roll prior to contact of the cores with the split webs on the winding drum.

3. (Amended) The method according to claim 1 in which said restraining step includes securing the core shaft at its ends against lateral movement by capturing the ends of the core shaft in an elongated slot that extends in a direction generally radially of the drum and provides a pathway for the core shaft with loaded cores thereon to be moved into contact with split rolls on said drum.

4. (Amended) A method of continuously winding split webs onto individual cores carried on a common elongated shaft into a corresponding plurality of large diameter rolls including transfer of the split webs, substantially at line speed, from fully wound rolls onto such cores, comprising the steps of:

(a) placing the core shaft with cores thereon into surface contact with such split webs supported on a winding drum and bringing said core shaft and cores thereon up to line speed;

(b) applying a driven nip roll to said cores substantially at line speed while simultaneously constricting the ends of said core shaft against movement lateral to a radius line from the axis of rotation of said drum through said core shaft;

(c) while said core shaft is so restrained, severing the split webs at positions downstream of the region of contact of said cores with said webs by said drum and simultaneously transferring said webs onto corresponding cores on said core shaft;

(d) continuing to wind said webs onto said cores while said core shaft is so constrained laterally and constrained by said driven nip roll against core shaft deflections that would otherwise cause critical speed limitations,

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in which the winder has a movable secondary support drum that is movable into contact with rolls building on the cores and in spaced relation to the winding drum, further including the step of bringing the secondary drum into contact with such rolls when the rolls have attained a predetermined diameter while maintaining contact of said driven nip roll with said building rolls.

13. (Amended) A method of continuously winding split webs onto individual cores carried on a common elongated shaft into a corresponding plurality of large diameter rolls including transfer of the split webs, substantially at line speed, from fully wound rolls onto such cores, comprising the steps of:

- (a) placing the core shaft with cores thereon into surface contact with such split webs supported on a winding drum and bringing said core shaft and cores thereon up to line speed;
- (b) applying a driven nip roll to said cores substantially at line speed while simultaneously constricting the ends of said core shaft against movement lateral to a radius line from the axis of rotation of said drum through said core shaft;
- (c) while said core shaft is so restrained, severing the split webs at positions downstream of the region of contact of said cores with said webs by said drum and simultaneously transferring said webs onto corresponding cores on said core shaft;
- (d) continuing to wind said webs onto said cores while said core shaft is so constrained laterally and constrained by said driven nip roll against core shaft deflections that would otherwise cause critical speed limitations,

in which the nip roll is driven at a speed mode prior to the cutting step and is switched to a speed limited adjustable torque mode following the transfer of the webs onto the cores of the core shaft.

14. (Amended) A method according to claim 13 including the step of spraying an adhesive on the inside surface of the webs leading to the fully wound rolls immediately prior to said cutting step for simultaneously gluing the tail segments of the cut webs onto the respective wound rolls and providing an adhesive surface by which the individual webs are attached to the respective cores on the core shaft.

14/13. (Amended) A drum type winder for continuously winding a split web into large diameter rolls on individual cores carried on a core shaft, comprising a frame, a main winding drum on said frame, a pair of arms mounted on said frame for rotation about an axis in common with the axis of said main winding drum, an elongated core shaft for supporting a plurality of cores thereon, a nip roll carried on said arms and engagable with cores on such core shaft, said arms being provided with generally radially extending slots through which the ends of said core shaft extend when a core is received in said slots, said slots defining walls that resist lateral movements of the core shaft ends while permitting rotation of said core shaft on said arms and movement of said core shaft radially of said drum along said slots, said slots being open at their respective outer radial ends to receive said core shaft therein and having a radial length that permits said core shaft to move radially inwardly to place the cores thereon in engagement with a web carried on the surface of said drum while said cores are simultaneously engaged by said nip roll, thereby maintaining said core shaft in a generally straight line position for transfer of webs onto cores on said shaft.

Please add new claims 19-73 as follows:

20/19. A winder for winding a web onto a core shaft, comprising:

- a winding drum, said winding drum being driven and being rotatable about a winding drum axis;
- a pressure roll, said pressure roll being driven, said pressure roll being movable among a plurality of pressure roll positions, said pressure roll being rotatable about a respective pressure roll axis in each of said pressure roll positions, each of said respective pressure roll axes being substantially parallel to each other and to said winding drum axis,
- a support roll, said support roll being driven, said support roll being movable among a plurality of support roll positions, said support roll being rotatable about a respective support roll axis in each of said support roll positions, each of said respective support roll axes being substantially parallel to each other, to each of said respective pressure roll axes and to said winding drum axis,
- a first support structure for supporting a first core shaft, said first core shaft having at least

one first core mounted thereon, at a first location where said first core is not in contact with said winding drum or said support roll, and at a first core shaft orientation where an axis of said first core shaft is substantially parallel to each of said respective support roll axes, each of said respective pressure roll axes and said winding drum axis,

one of said pressure roll positions being a position where said pressure roll is in contact with said first core in said first location, whereby said pressure roll causes said first core shaft to rotate about said axis of said first core shaft and controls a rate of rotational acceleration of said first core shaft about said axis of said first core shaft,

a guide structure for guiding said first core shaft from said first location to a second location where said first core abuts a first surface of a moving web, a second surface of the moving web being in contact with said winding drum,

a second support structure for supporting said first core shaft at a third location, said third location being a position where a wound web wound on said first core abuts said winding drum and abuts said support roll such that said support roll and said winding drum together support said wound web, said third location being spaced from said first location such that a second core shaft, said second core shaft having at least one second core mounted thereon, can be positioned in said first location while said web is continuing to be wound on said wound web on said first core shaft in said third location.

20. A winder as recited in claim 19, wherein said web is a split web.

21. A winder as recited in claim 20, wherein said first core shaft has a plurality of first cores mounted thereon and aligned along said axis of said first core shaft.

22. A winder as recited in claim 19, further comprising at least two primary support arms, said primary support arms each having slots, said guide structure comprising said slots.

23. A winder as recited in claim 22, wherein said slots are substantially radially aligned with a radius of said winding drum.

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24. A winder as recited in claim 22, wherein said primary arms are rotatable about said winding drum axis.

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25. A winder as recited in claim 22, wherein said pressure roll is mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms.

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26. A winder as recited in claim 24, further comprising at least one cam plate, said first support structure comprising a core shaft supporting surface of said cam plate, said core shaft supporting surface of said cam plate being substantially perpendicular to axes of said slots, whereby upon rotation of said primary support arms, said first core shaft is moved off of said core shaft supporting surface of said cam plate and then along said slots, thereby moving said first core shaft from said first location to said second location.

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27. A winder as recited in claim 19, further comprising a web transfer and cut-off shoe which extends transversely adjacent an outer surface of said winding drum, said web transfer and cut-off shoe being rotatable about said winding drum axis, said web transfer and cut-off shoe comprising a knife which is extendible above said shoe into a path of said web.

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28. A winder as recited in claim 19, further comprising at least two secondary support arms, said second support structure comprising elements mounted on said secondary support arms.

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29. A winder as recited in claim 28, further comprising at least two support roll mounting elements mounted on respective secondary support arms, said support roll mounting elements supporting said support roll and being movable relative to said secondary support arms, whereby said support roll can be moved relative to said first core shaft and can apply a desired pressure on said wound web wound on said first core.

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30. A winder as recited in claim 29, further comprising a frame, at least two primary

support arms, and at least one cam plate,

said secondary support arms being rotatable relative to said frame along a secondary support arm axis, said secondary support arm axis being substantially parallel to each of said respective support roll axes, each of said respective pressure roll axes and said winding drum axis,

said primary support arms each having slots,

said guide structure comprising said slots,

said winding drum being mounted on said frame,

said primary support arms being mounted on said frame and being rotatable about said winding drum axis,

said pressure roll being mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms,

said first support structure comprising a core shaft supporting surface of said cam plate,

said surface of said cam plate being substantially perpendicular to axes of said slots, whereby upon rotation of said primary support arms, said first core shaft is moved off of said surface of said cam plate and then along said slots, thereby moving said first core shaft from said first location to said second location.

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31. A winder as recited in claim 30, further comprising:

a first angle encoder for measuring an angle of said pressure roll support arms relative to said primary support arms, for detecting the location of said pressure roll relative to said primary support arms;

a second angle encoder for measuring an angle of said secondary support arms relative to said frame;

a web transfer and cut-off shoe which extends transversely adjacent an outer surface of said winding drum, said web transfer and cut-off shoe being rotatable about said winding drum axis, said web transfer and cut-off shoe comprising a knife which is extendible above said shoe into a path of said web;

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said secondary support arms each comprising a notch for receiving an end of said first core shaft;

notch closing slides mounted on respective secondary support arms, said notch closing slides being movable between a notch slide open position, in which said first core shaft can be removed from said notches, and a notch slide closed position, in which said first core shaft is locked in said notches;

at least one proximity switch mounted on at least one of said secondary support arms, said proximity switch being positioned such that it is actuated only if said first core shaft is lifted upwardly within at least one of said notches; and

a spray bar and a plurality of spray nozzles mounted on said spray bar, said spray bar being positioned such that said web passes adjacent to said spray bar and then passes adjacent to said web transfer and cut-off shoe.

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32. A winder for winding a web onto a core shaft, comprising:

a winding drum, said winding drum being driven and being rotatable about a winding drum axis;

a pressure roll, said pressure roll being driven, said pressure roll being movable among a plurality of pressure roll positions, said pressure roll being rotatable about a respective pressure roll axis in each of said pressure roll positions, each of said respective pressure roll axes being substantially parallel to each other and to said winding drum axis,

a support roll, said support roll being driven, said support roll being movable among a plurality of support roll positions, said support roll being rotatable about a respective support roll axis in each of said support roll positions, each of said respective support roll axes being substantially parallel to each other, to each of said respective pressure roll axes and to said winding drum axis,

a first core shaft positioned at a first location, said first core shaft having at least one first core mounted thereon,

a first support structure supporting said first core shaft at said first location, said first core shaft being not in contact with said winding drum or said support roll, an axis of said first core

shaft being substantially parallel to each of said respective support roll axes, each of said respective pressure roll axes and said winding drum axis,

said pressure roll being in contact with said first core, thereby causing said first core shaft to rotate about said axis of said first core shaft and controlling a rate of rotational acceleration of said first core shaft about said axis of said first core shaft,

a second core shaft positioned at a third location, said second core shaft having at least one second core mounted thereon,

a moving web being wound on said second core to form a wound web,

a guide structure for guiding said first core shaft from said first location to a second location where said first core shaft abuts a first surface of said moving web, a second surface of said moving web being in contact with said winding drum,

a second support structure supporting said second core shaft at said third location, where said wound web being wound on said second core abuts said winding drum and said support roll such that said support roll and said winding drum together support said wound web.

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33. A winder as recited in claim 32, wherein said web is a split web.

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34. A winder as recited in claim 33, wherein said first core shaft has a plurality of first cores mounted thereon and aligned along said axis of said first core shaft.

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35. A winder as recited in claim 32, further comprising at least two primary support arms, said primary support arms each having slots, said guide structure comprising said slots.

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36. A winder as recited in claim 35, wherein said slots are substantially radially aligned with a radius of said winding drum.

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37. A winder as recited in claim 35, wherein said primary arms are rotatable about said winding drum axis.

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39 38. A winder as recited in claim 35, wherein said pressure roll is mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms.

40 39. A winder as recited in claim 37, further comprising at least one cam plate, said first support structure comprising a core shaft supporting surface of said cam plate, said core shaft supporting surface of said cam plate being substantially perpendicular to axes of said slots, whereby upon rotation of said primary support arms, said first core shaft is moved off of said core shaft supporting surface of said cam plate and along said slots, thereby moving said first core shaft from said first location to said second location.

41 40. A winder as recited in claim 32, further comprising a web transfer and cut-off shoe which extends transversely adjacent an outer surface of said winding drum, said web transfer and cut-off shoe being rotatable about said winding drum axis, said web transfer and cut-off shoe comprising a knife which is extendible above said shoe into a path of said web.

42 41. A winder as recited in claim 32, further comprising at least two secondary support arms, said second support structure comprising elements mounted on said secondary support arms.

43 42. A winder as recited in claim 41, further comprising at least two support roll mounting elements mounted on respective secondary support arms, said support roll mounting elements supporting said support roll and being movable relative to said secondary support arms, whereby said support roll can be moved relative to said second core shaft and can apply a desired pressure on said wound web wound on said second core.

44 43. A winder as recited in claim 42, further comprising a frame, at least two primary support arms, and at least one cam plate,

said secondary support arms being rotatable relative to said frame along a secondary support arm axis, said secondary support arm axis being substantially parallel to each of said

respective support roll axes, each of said respective pressure roll axes and said winding drum axis,

said primary support arms each having slots,

said guide structure comprising said slots,

said winding drum being mounted on said frame,

said primary support arms being mounted on said frame and being rotatable about said winding drum axis,

said pressure roll being mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms,

said first support structure comprising a core shaft supporting surface of said cam plate,

said surface of said cam plate being substantially perpendicular to axes of said slots, whereby upon rotation of said primary support arms, said first core shaft is moved off of said surface of said cam plate and along said slots, thereby moving said first core shaft from said first location to said second location.

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44. A winder as recited in claim 43, further comprising:

a first angle encoder for measuring an angle of said pressure roll support arms relative to said primary support arms, for detecting the location of said pressure roll relative to said primary support arms;

a second angle encoder for measuring an angle of said secondary support arms relative to said frame;

a web transfer and cut-off shoe which extends transversely adjacent an outer surface of said winding drum, said web transfer and cut-off shoe being rotatable about said winding drum axis, said web transfer and cut-off shoe comprising a knife which is extendible above said shoe into a path of said web;

said secondary support arms each comprising a notch for holding an end of said second core shaft;

notch closing slides mounted on respective secondary support arms, said notch closing

slides being movable between a notch slide open position, in which said second core shaft can be removed from said notches, and a notch slide closed position, in which said second core shaft is locked in said notches;

at least one proximity switch mounted on at least one of said secondary support arms, said proximity switch being positioned such that it is actuated only if said second core shaft is lifted upwardly within at least one of said notches; and

a spray bar and a plurality of spray nozzles mounted on said spray bar, said spray bar being positioned such that said web passes adjacent to said spray bar and then passes adjacent to said web transfer and cut-off shoe.

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45. A method of winding a web onto a core shaft, comprising:

positioning a first core shaft on a first support structure at a first location, said first core shaft having at least one first core mounted thereon;

bringing a pressure roll into contact with said first core shaft, said pressure roll having a pressure roll axis which is substantially parallel to a pressure roll axis of said first core shaft;

driving said pressure roll about said pressure roll axis, thereby causing said first core shaft to rotate about said first core shaft axis due to said contact between said pressure roll and said first core shaft;

moving said first core shaft from said first location to a guide structure and through said guide structure to a second location, in which said first core abuts a first surface of a moving web, a second surface of said moving web being in contact with a winding drum, an axis of said first core shaft in said second location being substantially parallel to an axis of said winding drum;

cutting said moving web to produce a first tail end of said web and a first leading end of said web;

contacting said first leading end of said web with said first core;

initiating winding of said web onto said first core;

continuing winding of said web on said first core to produce a growing wound web wound on said first core, said growing wound web being supported by said winding drum and being pressured by said pressure roll;

continuing winding of said web on said first core while bringing into contact with said growing wound web a support roll, said support roll having a support roll axis which is parallel to an axis of said first core, whereby said growing wound web is supported by said winding drum and said support roll;

continuing winding of said web on said first core while said growing wound web is being supported by said winding drum and said support roll, and said first core shaft is being held in place by a second support structure;

continuing winding of said web on said first core while positioning a second core shaft on said first support structure at said first location, said second core shaft having at least one second core mounted thereon;

continuing winding of said web on said first core while bringing said pressure roll into contact with said second core, said pressure roll axis being substantially parallel to an axis of said second core shaft;

continuing winding of said web on said first core while driving said pressure roll about said pressure roll axis, thereby causing said second core shaft to rotate about said second core shaft axis due to said contact between said pressure roll and said second core;

continuing winding of said web on said first core while moving said second core shaft from said first location to a guide structure and through said guide structure to said second location, in which said second core abuts said first surface of said moving web, said second surface of said moving web being in contact with said winding drum, an axis of said second core shaft in said second location being substantially parallel to an axis of said winding drum;

cutting said moving web to produce a second tail end of said web and a second leading end of said web;

contacting said second leading end of said web with said second core;

initiating winding of said web onto said second core; and

moving said first core shaft, said first core and said wound web wound on said first core to a removal position.

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46. A method as recited in claim 45, wherein said web is a split web.

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47. A method as recited in claim 46, wherein said first core shaft has a plurality of cores aligned along said axis of said first core shaft.

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48. A method as recited in claim 45, wherein said guide structure comprises slots formed in at least two primary support arms, said slots being substantially radially aligned with a radius of said winding drum, said primary arms being rotatable about said winding drum axis, said pressure roll being mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms.

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49. A method as recited in claim 48, wherein said moving said first core shaft from said first location to a guide structure and through said guide structure to a second location is carried out by rotating said primary support arms, thereby causing said first core shaft to move off of a core shaft supporting surface and into said slots, said first core shaft being moved through said slots by gravity, thereby moving said first core shaft from said first location to said second location.

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50. A method as recited in claim 48, wherein during said winding of said web on said first core to produce a growing wound web wound on said first core, said growing wound web being supported by said winding drum and being pressured by said pressure roll, said first core shaft moves within said slots.

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51. A method as recited in claim 48, wherein said second support structure comprises at least one support element mounted on each of at least two secondary support arms,

at least one support roll mounting element mounted on each of said secondary support arms,

said support roll mounting elements supporting said support roll and being movable relative to said secondary support arms, whereby said support roll can be moved relative to said first core and can apply a desired pressure to said growing wound web,

said secondary support arms being rotatable relative to a frame along a secondary support



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arm axis,

said secondary support arm axis being substantially parallel to said winding drum axis,

said winding drum being mounted on said frame,

said primary support arms being mounted on said frame and being rotatable about said winding drum axis,

said pressure roll being mounted on at least two pressure roll support arms which are rotatably mounted on said primary arms.

~~53~~ 52. A method as recited in claim ~~45~~ ~~46~~, further comprising closing at least two notch closing slides after said initiating winding of said web onto said first core,

said notch closing slides being mounted on respective secondary support arms,

said secondary support arms each supporting at least one support element,

said support elements comprising said second support structure,

said secondary support arms each comprising a notch,

said first core shaft being positioned within notches when said notch closing slides are closed, thereby locking said first core shaft in said notches.

~~54~~ ~~53~~ 53. A method as recited in claim ~~52~~ ~~53~~, wherein said first core shaft is locked in said notches when said first core shaft, said first core and said wound web wound on said first core are moved to a removal position.

~~56~~ ~~44~~ 54. A method as recited in claim ~~48~~ ~~44~~, further comprising spraying an adhesive onto said web prior to and during said cutting said moving web.

~~56~~ ~~55~~ 55. A method as recited in claim ~~54~~ ~~55~~, further comprising spraying an adhesive onto said web after said cutting said moving web.

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56. A method as recited in claim 45, wherein said first core shaft is rotating at a rotational speed which substantially matches a speed of said moving web before moving said first core shaft from said first position to second position.

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57. A method as recited in claim 45, wherein after said cutting said moving web, said pressure roll is switched from a speed mode, where a rate of rotation of said pressure roll substantially matches a speed of said moving web, to a speed limited adjustable torque mode.

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58. A method as recited in claim 45, wherein during said continuing winding of said web on said first core while said growing wound web is being supported by said winding drum and said support roll, and said first core shaft is being held in place by a second support structure, said pressure roll is retracted out of contact from said growing wound web.

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59. A method as recited in claim 45, wherein during said continuing winding of said web on said first core while said growing wound web is being supported by said winding drum and said support roll, and said first core shaft is being held in place by a second support structure, said support roll is switched from a speed mode, where a rate of rotation of said pressure roll substantially matches a speed of said moving web, to a speed limited adjustable torque mode.

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60. A method as recited in claim 45, wherein during said continuing winding of said web on said first core while said growing wound web is being supported by said winding drum and said support roll, and said first core shaft is being held in place by a second support structure, said support roll is switched from a balanced mode, where said support roll merely supports the weight of the first core shaft, the first core and the growing wound web, to a programmed support pressure mode, where said support roll applies supports said weight and also applies pressure to said growing wound web according to a pressure program.

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61. A method as recited in claim 45, wherein before said cutting said moving web, said pressure roll is moved into contact with said first core after said first core shaft has been moved

to said second location, said pressure roll rotating at a rate of rotation which substantially corresponds to a rate of speed of said moving web.

62. A method as recited in claim 45, wherein a rate of rotation of said first core shaft about said first core shaft axis is increased when said first core shaft reaches said second location and comes into contact with said first surface of said moving web.

63. A method as recited in claim 45, wherein when said first core shaft is in said location, said first core shaft is sandwiched between said pressure roll and said winding drum, whereby critical speed problems are avoided.

64. A method as recited in claim 45, wherein said first core shaft axis is located in a plane which passes through said axis of said winding drum and which defines an angle of about -20° with respect to a vertical plane which passes through said axis of said winding drum when said cutting said moving web occurs, and said core shaft is moved during said continuing winding of said web on said first core to a position where said first core shaft axis is in a plane which passes through said axis of said winding drum and which defines an angle of about $+30^{\circ}$ with respect to said vertical plane.

65. A method as recited in claim 4, wherein the step of restraining said core shaft against lateral movement is maintained while winding said webs on said cores with said cores being held in secondary arms, said secondary arms holding said building rolls in contact with said secondary drum.

66. A method as recited in claim 4, wherein an axis of said core shaft is located in a plane which passes through an axis of said winding drum and which defines an angle of about -20° with respect to a vertical plane which passes through said axis of said winding drum when said severing the split webs occurs, and said core shaft is moved during said continuing to wind said webs onto said cores to a position where said axis of said core shaft is in a plane which

passes through said axis of said winding drum and defines which an angle of about $+30^\circ$ with respect to said vertical plane.

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67. A winder for winding a web onto a core shaft, comprising:

a winding drum, said winding drum being driven and being rotatable about a winding drum axis;

at least a first secondary support arm, said first secondary support arm being rotatable about a secondary support arm axis, said secondary support arm axis being substantially parallel to said winding drum axis;

at least a first core shaft support structure for supporting a core shaft rotatably with respect to a core shaft axis which is substantially parallel to said winding drum axis, said first core shaft support structure being on said first secondary support arm; and

a support roll mounted on said secondary support arm, said support roll being rotatable about a support roll axis, said support roll axis being substantially parallel to said winding drum axis.

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68. A winder as recited in claim 67, further comprising at least a second secondary support arm, said second secondary support arm being rotatable about said secondary support arm axis;

said support roll being mounted on said first and second secondary support arms;

said second secondary support arm having a second core shaft support structure, said first core shaft support structure and said second core shaft support structure being adapted to cooperate to support a core shaft.

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69. A winder as recited in claim 67, further comprising a core shaft, a core and a moving web, said core shaft being at least partially supported by said first core shaft support structure, said core being mounted on said core shaft, and at least a portion of said moving web being wound on said core to form a wound web.

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70. A winder as recited in claim 67, wherein said support roll is movable relative to said first secondary support arm with said support roll axis remaining substantially parallel to said winding drum axis.

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71. A method of winding a web onto a core shaft, comprising:

winding a moving web onto a wound web which is wound around a core shaft while said core shaft is rotating about a core shaft axis, said moving web passing between and in contact with said wound web and a winding drum, said moving web also passing between and in contact with said wound web and a support roll, said winding drum rotating about a winding drum axis which is substantially parallel to said core shaft axis, said support roll rotating about a support roll axis which is substantially parallel to said core shaft axis, said core and said support roll each being at least partially supported by a first secondary support arm;

cutting said moving web; and

pivoting said first secondary support arm about a first secondary support arm axis, said first secondary support arm axis being substantially parallel to said core shaft axis.

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72. A method as recited in claim 71, further comprising moving said support roll relative to said first secondary support arm from a first position where said support roll is not in contact with said moving web to a second position where said support roll is in contact with said moving web, said support roll axis being substantially parallel to said core shaft axis while said support roll is in said first position and while said support roll is in said second position.

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73. A method as recited in claim 71, further comprising causing said support roll to apply pressure to said wound web in order to brake said core shaft and wound web to reduce a rate of rotation of said core shaft about said core shaft axis.